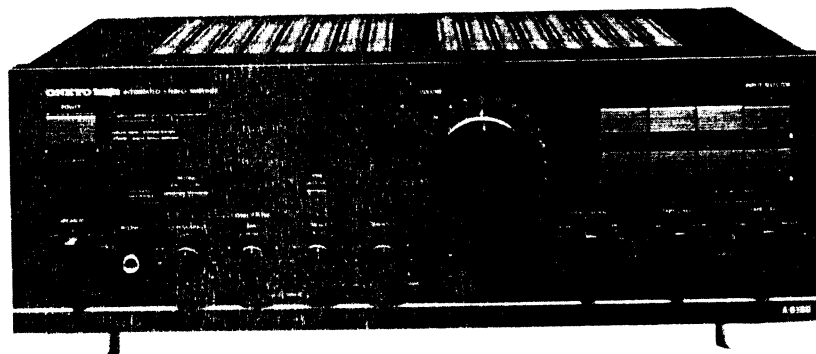


ONKYO® SERVICE MANUAL

Integrated Stereo Amplifier MODEL A-8190



UD	120V AC, 60Hz
UG	220V AC, 50Hz
UQ	240V AC, 50Hz
UW, UWX	120V/220V AC, 50Hz/60Hz

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK Δ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PARTS NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

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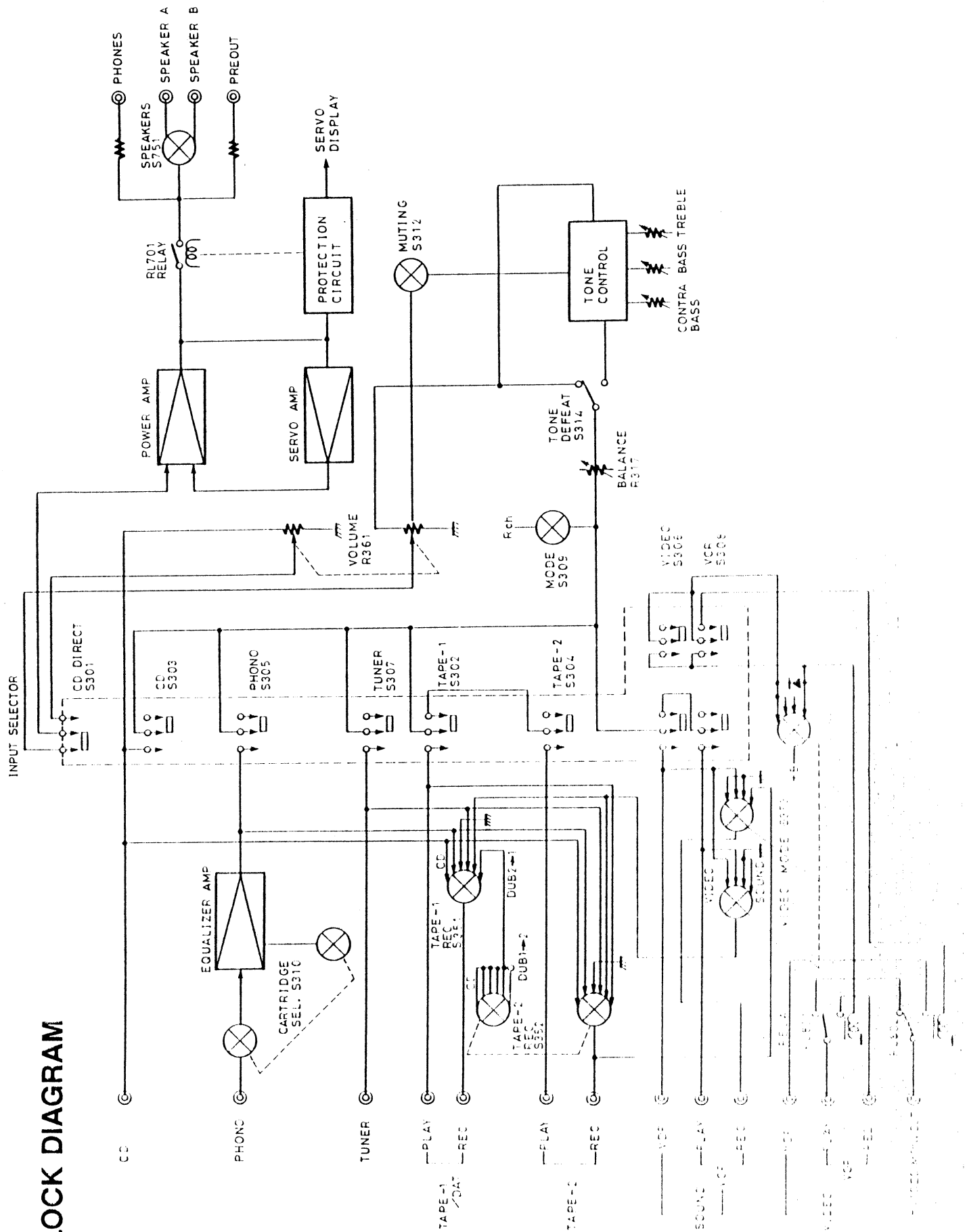
ONKYO
AUDIO COMPONENTS

SPECIFICATIONS

Power Output:	100 watts per channel, min RMS. at 8 ohms, both channels driven from 20 Hz to 20 kHz, with no more than 0.008% Total harmonic distortion.
Dynamic Power:	303 watts 2 ohms, 235 watts 4 ohms
Total Harmonic Distortion	0.008% at rated power 0.008% at 1 watt output
Intermodulation Distortion:	0.005% at rated power
Damping Factor:	50 at 8 ohms
Input Sensitivity/ Impedance:	Phono (MM): 2.5 mV/50 kohms Phono (MC): 160 μ V/220 ohms CD DIRECT: 150 mV/50 kohms TUNER: 150 mV/50 kohms Tape Play: 150 mV/50 kohms VCR Play: 150 mV/50 kohms VDP Play: 150 mV/50 kohms Tape Rec: 150 mV/1.5 kohms (Phono)
Output Level/Impedance:	Pre Out: 1 V/600 ohms
Phono Overload:	Phono (MM): 200 mV RMS. at 1 kHz, 0.015% THD.
Tone Control (Vol -20 dB):	CONTRABASS: +10/-20 dB (Muting: OFF/ON) at 20 Hz BASS: $\pm$ 10 dB at 70 Hz TREBLE: $\pm$ 8 dB at 20 kHz
High Cut:	6 kHz (6 dB/Octave) (TREBLE min.)
Frequency Response:	CD, Tuner: 2 Hz-50 kHz (+0, -1 dB)
RIAA Deviation:	Phono (MM): $\pm$ 0.3 dB, 20 Hz-20 kHz
Signal to Noise Ratio (IHF-A):	Phono (MM): 94 dB (5 mV input) Phono (MC): 75 dB (0.5 mV input) CD DIRECT: 107 dB
Muting (Vol -20 dB):	-15 dB
Power Supply:	USA & Canadian models: AC120V, 60 Hz European models: AC220V, 50 Hz U.K & Australia models: AC240V, 50 Hz Worldwide models: AC120V 60Hz and AC220V 50Hz switchable
Dimensions:	435(W) x 157(H) x 396(D) mm 17-1/8" x 6-3/16" x 15-9/16"
With side panels:	465(W) x 158(H) x 396(D) mm 18-5/16" x 6-2/8" x 15-9/16"
Weight:	13.2 kg, 29.1 lbs.
With side panels:	14.6 kg, 32.2 lbs.

Only PX. models are equipped with wood grain side panels.

BLOCK DIAGRAM



ADJUSTMENT PROCEDURES

1. Preparations
- 1) Leave the machine in a normal condition parallel to the work bench, maintaining a clearance of 15mm from the bottom for air circulation.

2) Set the level to minimum with no load and no signal.

3) When making the adjustment, there must be no breeze blowing from the outside.
2. Adjustment of idling current
- 1) Turn ON the power switch, and leave the unit as is for about 5 minutes.

2) Adjust the semi-fixed resistor R531 (R532) so that the voltage between the terminals V_{et} and I_{id} of the printed circuit board NAAF-2969 is 7.5mV.
3. Operating check of protection circuit
- 1) When the power switch is turned ON.
 - After about 6 second, relay RL701 of the NAAF-2969 printed circuit board go ON.
 - Operation indicator lights.

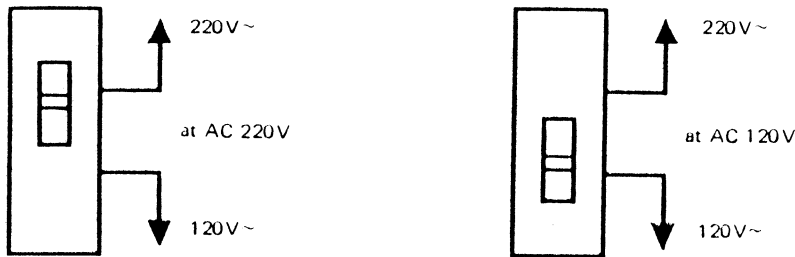
2) When the power is turned OFF.
 - Immediately a relay go OFF.

3) With no load, when $\pm 200\text{mV}$ DC is CD input, the speaker relay go OFF.

Caution: During this test, there should be absolutely no load connected and the load terminals must not be shorted.

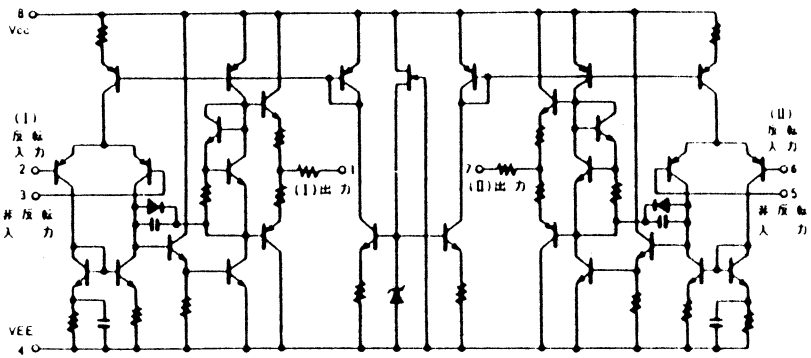
PRECAUTIONS

1. Replacing the fuses
- For continued protection against risk fire, replace only with same type and same rating fuse.
- | CIRCUIT NO. | PART NO. | DESCRIPTION |
|-------------|--------------------|--|
| 1901 | 252052 | 7A(ST-6), Primary fuse (120V model) |
| 1902 | 252077 or 252077CC | 4A-SE-EAK Primary fuse (220V, 240V, 120V/220V model) |
2. Insulation resistance measurement (Only U.S.A. model)
- Connect the insulating-resistance tester between the plug of power supply cable and the terminal GND on the back panel. Specifications; More than 10 M Ω at 500V.
3. Voltage selector (rear panel)
- Worldwide models are equipped with a voltage selector to conform with local power supplies. Be sure to set this switch to match the voltage of the power supply in your area before turning the power switch on. Voltage is changed by sliding the groove in the switch with a screwdriver or similar instrument to up or down position. Confirm that the switch has been moved all the way to up or down before turning the power switch on. If there is no voltage selector switch on the unit you have purchased, it can only be used in areas where the power supply voltage is the same as that of the unit.

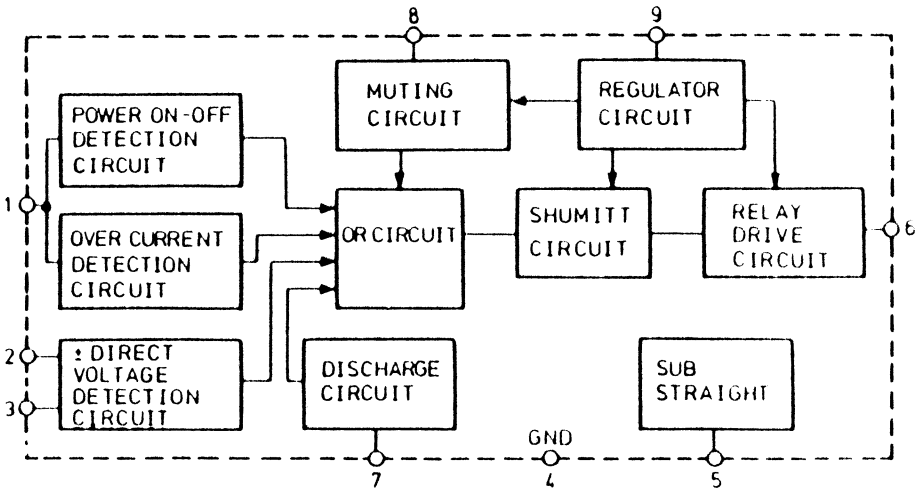


IC BLOCK DIAGRAM

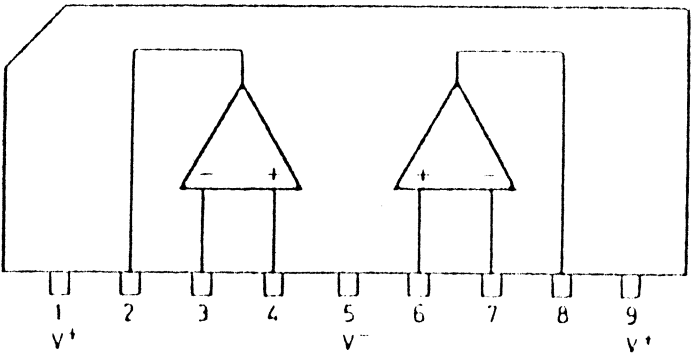
NJM-4560DX(OP Amp)



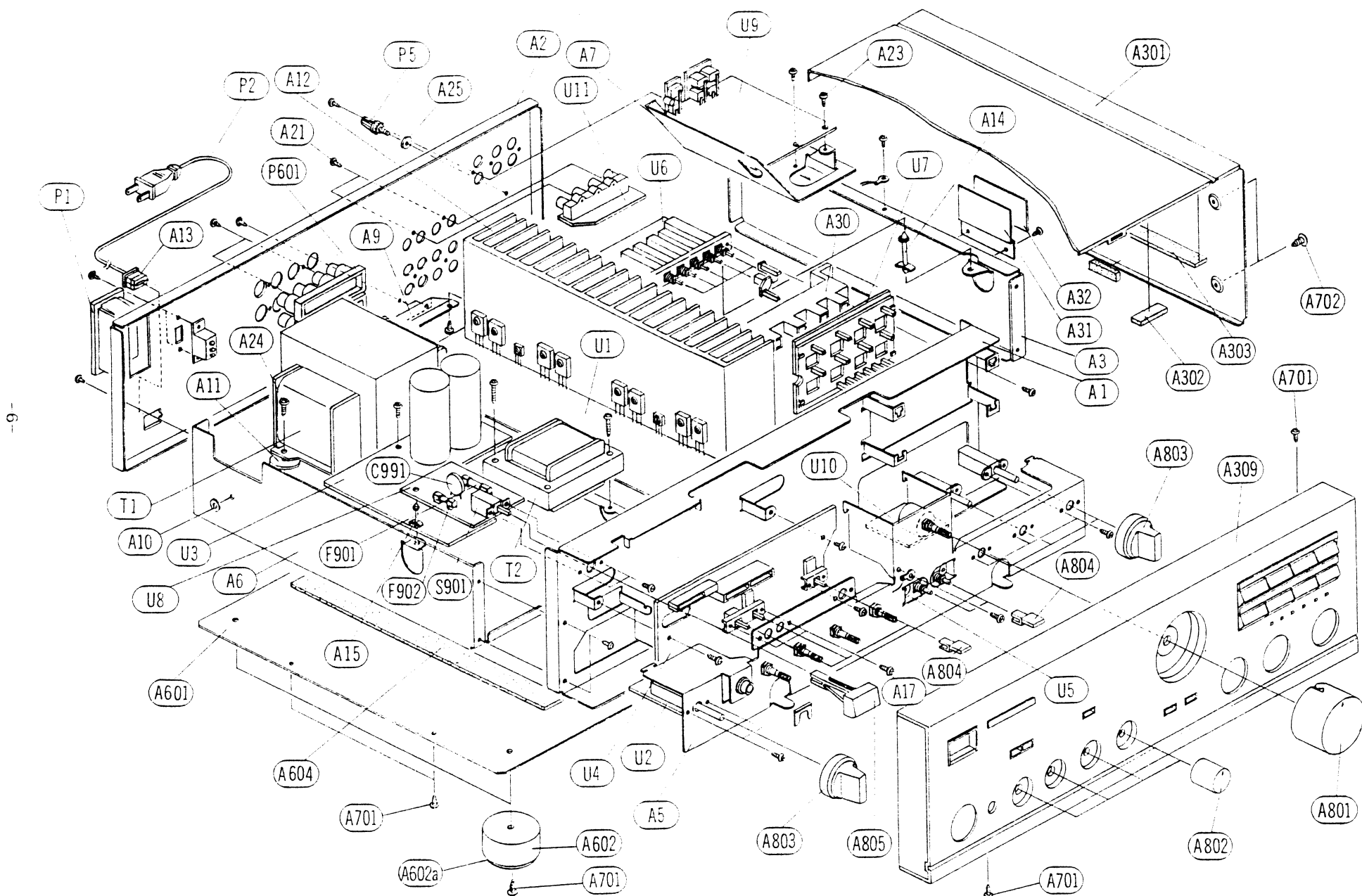
TA7317P(Protection Circuit)



NJM-4558SE (OP Amp)



CHASSIS-EXPLODED VIEW



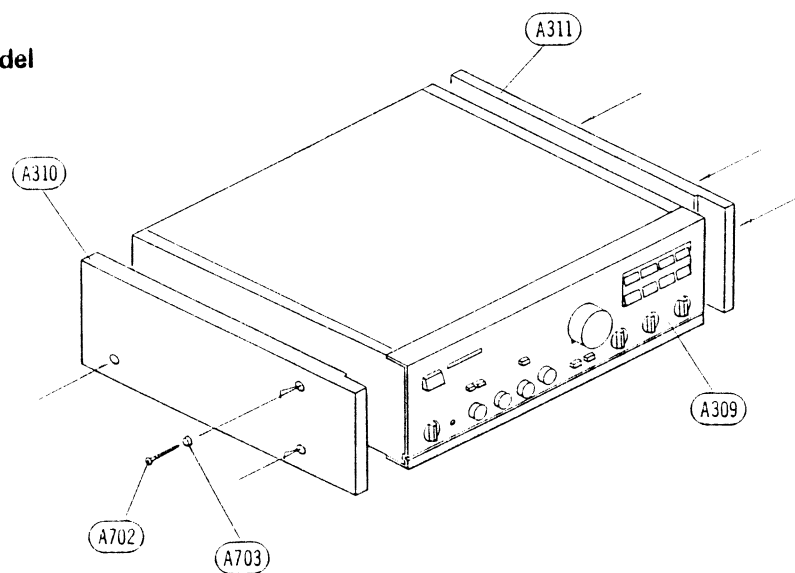
CHASSIS-EXPLODED VIEW-PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
A1	27110305C	FRONT BRACKET	A805	28322702	KNOB (POW)		2201696 or	2SA1491 P or
A2	27120998	BACK PANEL	ΔT1	2300227A	POWER TRANSFORMER, NPT-935D		2201694	2SA1491 Y
A2	27120999	BACK PANEL [G]	ΔT1	2300228A	POWER TRANSFORMER, NPT-935G [G]	U1	1A030569-1	NAAF-2969-1, REC.SELECTOR AND POWER AMPLIFIER CIRCUIT PC BOARD ASS'Y
A2	27121001	BACK PANEL [W]	ΔT1	2300229	POWER TRANSFORMER, NPT-935DG [W][X]	U2	1A030570-1	NASW-2970-1, SPEAKER SWITCH PC BOARD ASS'Y
A2	27121002	BACK PANEL [X]	ΔT1	2300240A	POWER TRANSFORMER, NPT-935Q [A][B]	U3	1A030573-1	NAPS-2973-1, POWER SUPPLY PC BOARD ASS'Y
A2	27121003	BACK PANEL [A][B]	ΔT2	231125	CHOKE COIL	U4	1A030574-1	NASW-2974-1, TONE AND MUTING SWITCH PC BOARD ASS'Y
A3	27115224	SIDE BRACKET	ΔS1	25065123	SLIDE SWITCH, NSS-1258P [W][X]	U5	1A030575-1	NAAF-2975-1, TONE CONTROL CIRCUIT PC BOARD ASS'Y
A5	27130448A	BRACKET (F)	ΔS901	25035398	POWER SWITCH, NPS-111-L362P	U6	1A030576-1	NASW-2976-1, INPUT SELECTOR SWITCH PC BOARD ASS'Y
A6	27130449A	BRACKET (L)	ΔP1	25050293	AC SOCKET, NSCT-6P120 [D][X]	U7	1A030577-1	NADIS-2977-1, DISPLAY LED PC BOARD ASS'Y
A7	27130450	BRACKET (EQ)	ΔP2	253123 or	AC CORD, AS-UC-6#18 or [D][X]	U8	1A030578-1	NASW-2978-1, POWER SWITCH PC BOARD ASS'Y
A8	28140730	CUSHION		253136 or	AC CORD, AS-UC-6#18 or [D][X]	U8	1A030578-1A	NASW-2978-1A, POWER SWITCH PC BOARD ASS'Y [G][A][B]
A9	27141084A	BRACKET (H)		253140	AC CORD, AS-UC-6#18 [D][X]	U8	1A029578-1B	NASW-2978-1A, POWER SWITCH PC BOARD ASS'Y [W]
A10	27270212	SPACER		253130A or	AC CORD, AS-CEE or [G]	U8	1A029578-1C	NASW-2978-1C, POWER SWITCH PC BOARD ASS'Y [X]
A11	27270213	SPACER (PT)		253128B	AC CORD, AS-CEE [G]	U9	1A030579-1	NAAF-2979-1, EQUALIZER CIRCUIT PC BOARD ASS'Y
A12	27160206	HEATSINK		253092-1A	AC CORD, AS-CEE-2 [W]	U10	1A030580-1	NAAF-2980-1, VOLUME CONTROL PC BOARD ASS'Y
A13	27300750	BUSHING (CORD)		253118	AC CORD, AS-SAA [A]	U11	1A030582-1	NAETC-2982-1, VIDEO TERMINAL PC BOARD ASS'Y
A14	27190164	HOLDER LCBS-14NS		728320 or	AC CORD, 2-0.75BS16 BLK/GRY [B]			
A15	27190062	HOLDER LCBS-12N		728328	AC CORD, 2-0.75BS16 BLK/GRY [B]			
A17	82143006	PAN HEAD SCREW, 3P+6FNBC			TERMINAL			
A21	834430108	TAP-TIGHT SCREW, 3TTS+10BBC		25060044	TERMINAL, NTM-4PRMN42			
A23	831130088	TAP-TIGHT SCREW, 3TTW+8B	ΔP2	25060108	FUSE, 7A ST-6			
A24	830440109	TAP-TIGHT SCREW, 4TTC+10CBC	ΔP2	252052	FUSE HOLDER, S-N5051			
A25	87613010	WASHER, W3X10F	ΔP2	252077 or	FUSE, 4A-SE-EAK or [G][W][X][A][B]			
A30	27273059A	JOINT AS	ΔP2	252077CC	FUSE, 4A-SE-EAK [G][W][X][A][B]			
A31	27150236	SHIELD PLATE			FUSE HOLDER, YSH403T [G][W][X][A][B]			
A32	28175140	INSULATING PLATE		25050065	0.01μF, AC 400V/125V, CAPACITOR (IS)			
A301	28184333A	TOP COVER		3500065A	2SC3419 Y or			
A302	28140020	CUSHION			2SC3419 C			
A303	28140695	CUSHION			2SC3855 G or			
A309	1A029121	FRONT PANEL [D][G][W][A]			2SC3855 P or			
A309	1A029121UWX	FRONT PANEL [X]			2SC3855 Y			
A310	28185286	SIDE BOARD LEFT [X]			2SA1491 O or			
A311	28185287	SIDE BOARD RIGHT [X]			2SA1491 P or			
A601	27170234E	BOTTOM BOARD			2SA1491 Y			
A602	27175153	LEG ASS'Y			2SC3855 G or			
(A602a)	28140747	CUSHION			2SC3855 P or			
A604	28140961	CUSHION, 25X140mm			2SC3855 Y			
A701	834430088	TAP-TIGHT SCREW, 3TTS+8BBC			2SA1491 O or			
A702	83844089	TAP-TIGHT SCREW, 4TTB+8CBC [D][G][W][A][B]			2SA1491 P or			
A702	836440303	TAPPING SCREW			2SC3855 G or			
A703	870086	SPECIAL WASHER 4X12BSBC [X]			2SC3855 P or			
A801	28323027	KNOB (VOL)			2SC3855 Y			
A802	28323029	KNOB (TONE)			2SA1491 O or			
A803	28323030	KNOB (SP)			2SA1491 P or			
A804	28323031	KNOB (PUSH)			2SC3855 G or			

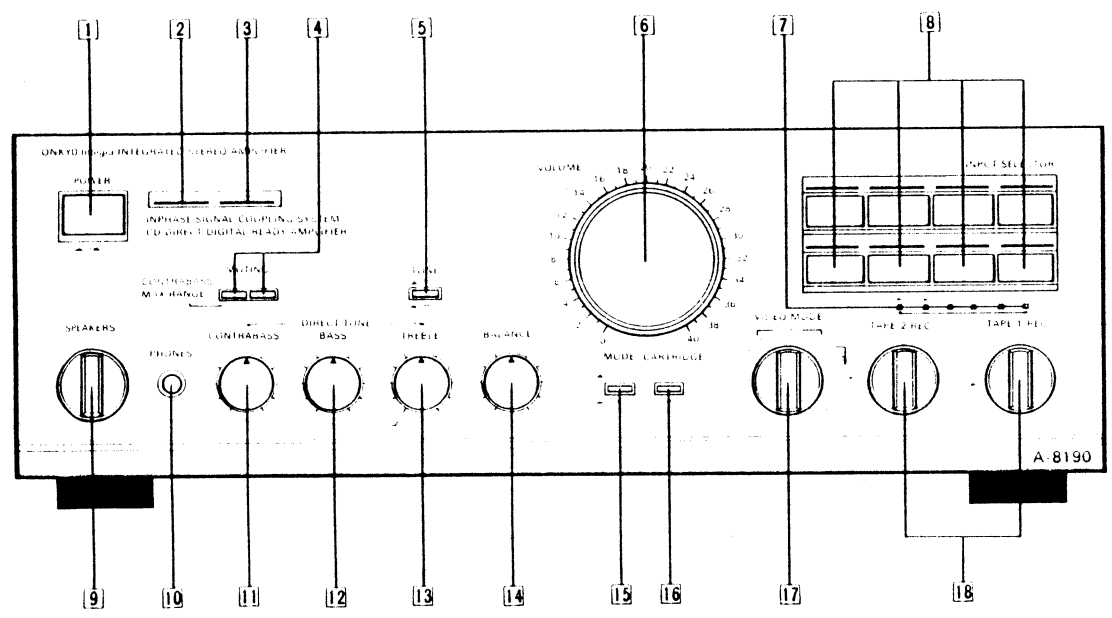
NOTE [D]: ONLY 120V MODEL
[G]: ONLY 220V MODEL
[W]: ONLY 120V/220V MODEL
[X]: ONLY MILITARY MARKET MODEL
[A]: ONLY AUSTRALIAN MODEL
[B]: ONLY BRITISH MODEL

NOTE: THE COMPONENTS IDENTIFIED BY MARK Δ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PARTS NUMBER SPECIFIED.

Military market model



FRONT PANEL FACILITIES



1. Power switch (POWER)

2. Servo operation indicator (SERVO OPERATION)

3. Contra bass indicator (CONTRA BASS/20dB)

4. Muting switch (MUTING)

5. Tone switch (TONE)

6. Volume control (VOLUME)

7. Recording mode indicators

8. Input selector switches and indicator (INPUT SELECTOR)
CD DIRECT, CD, PHONO, TUNER, TAPE-1/DAT, TAPE-2, VDP, VCR

9. Speaker selector (SPEAKERS)
OFF, A, B, A+B

10. Headphone jack (PHONES)

11. Contra bass (CONTRA BASS)

12. Bass control (BASS)

13. Treble control (TREBLE)

14. Balance control (BALANCE)

15. Mode selector (MODE)
STEREO, MONO

16. Cartridge selector (CARTRIDGE)
MC, MM

17. Video mode switch (VIDEO MODE)
SOUND, OFF, VDP-VCR, VDP

18. Recording source selectors (TAPE-1 REC, TAPE-2 REC)
TAPE-1 DVB 2 ▶ 1, [V], TUNER, OFF, PHONO, CD
TAPE-2 DVB 1 ▶ 2, [V], TUNER, OFF, PHONO, CD

PRINTED CIRCUIT BOARD PARTS LIST

REC.SELECTOR AND POWER AMPLIFIER CIRCUIT PC BOARD (NAAF-2969-1)-PART LIST

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
Q519, Q520 Q701	ICs		R507, R508 R523, R524 R525, R526 R527, R528 R531, R532 R533, R534 R601, R602 R603~R606 R607~R614 R615~R630 R635~R638 R645~R648 R649, R650 R717 R901, R902 R903, R904 R905, R906	Resistors	
	222942	NJM4558SE		441623314NF	330Ω, 1W, Metal oxide film
	222584	TA7317P		442520684F	6.8Ω, 1/2W, Metal oxide film
Q501, Q502	Transistors			442525614F	560Ω, 1/2W, Metal oxide film
	2212805 or	2SK389 GR or		442524734F	47kΩ, 1/2W, Metal oxide film
	2212806 or	2SK389 BL or		5210062	N06HR4.7KBD, Semi-fixed
Q503~Q506, Q617 Q618	2212807	2SK389 V		442524314F	430Ω, 1/2W, Metal oxide film
	2211733 or	2SC1845 E or		442521024F	1kΩ, 1/2W Metal oxide film
	2211732	2SC1845 F		442525104F	51Ω 1/2W, Metal oxide film
Q507, Q508,	2211515 or	2SA995 F or		442520224F	2.2Ω, 1/2W, Metal oxide film
	2211516	2SA995 G		4000063	0.47Ω, 2W, Metal plate
	2211634 or	2SC2229 Y or		4000061	0.33Ω, 2W, Metal plate
Q516, Q601, Q602	2211633	2SC2229 O		441621604NF	16Ω, 1W, Metal oxide film
	2211455 or	2SA1015 GR or		442521204F	12Ω, 1/2W, Metal oxide film
	2210803	2SA733 P		441522294F	0.22Ω, 1/2W, Metal oxide film
Q513, Q514, Q603 Q604	2211354 or	2SA949 Y or		441623004NF	30Ω, 1W, Metal oxide film
	2211353	2SA949 O		442525114F	510Ω, 1/2W, Metal oxide film
	2200864 or	2SC2238 Y or		442528224F	8.2kΩ, 1/2W, Metal oxide film
Q605, Q606	2200863	2SC2238 O		Relay	
	2200874 or	2SA968 Y or	RL701	25065316	NRI-2P/A DC 12-43
	2200873	2SA968 O		Switches	
Q901	2201512 or	2SD1200 Q or		25030261	NRSM 144-15SS
	2201513	2SD1200 R	S351	25030260	NRSM 166-15SS
	2201502 or	2SB889 Q or	S352	25030259	NRSM 164-15SS
Q902	2201503	2SB889 R	S353	Terminals	
	Diodes		P391, P392, P393 P394	25045165	NPJ-4PDBL-59
	D351~D504, D513	223163	1SS133	Sockets	
D507~D510, D514			P501	2000551	NSAS-6P507
D517~D520, D704				Plate	
D505, D506, D511	225232	LTZ R15, LED		27300879	Bus
D512			SPEAKER SWITCH PC BOARD (NASW 2970-1) PARTS LIST		
D515, D516	4000068	VD1222			
D701	223890	W01RL			
D702	223145	1S2076TD			
D703	2239493 or	RD6.2E B3 or			
	2243163	MTZ6.2-C			
	2239754 or	RD22E B4 or			
D901, D902	2243294	MTZ22-D			
	Coils				
L501, L502	231098A	NCH-4145			
L601, L602	231134S	S-0.8E			
	Capacitors				
C501, C502	372126804	68pF, 50V, Styrene			
C505, C506	354780229	2.2μF, 50V, Elect.			
C509, C510	379122235	0.022μF, 50V, Film (DEW)			
C511, C512	372123304	33pF, 50V, Styrene			
C513~C516	391252207	22μF, 25V, Elect.(MUSE)			
C605, C606	372121024	1200pF, 50V, Styrene			
C607, C608	379121045	0.1μF, 50V Film (DEW)			
C613~C616					
C609, C610	379124735	0.047μF, 50V, Film (DEW)			
C619, C620	372121024	1000pF, 50V Styrene			
C701	354722219	220μF, 6.3V, Elect.			
C703	354742209	22μF, 16V, Elect.			
C704	354784799	0.47μF, 50V, Elect.			
C706	354743319	330μF, 16V, Elect.			
C707	354744719	470μF, 16V, Elect.			
C708, C710	379122235	0.022μF, 50V Film (DEW)			
C712	354741019	100μF, 16V, Elect.			
C901, C902	354772219	220μF, 63V, Elect.			
C903, C904	354764709	47μF, 35V, Elect.			
C905, C906	354754719	470μF, 25V, Elect.			
C911, C912	354782219	220μF, 50V Elect.			

CIRCUIT NO.	PART NO.	DESCRIPTION
	Plate	
	27300732	Bus

TONE AND MUTING SWITCH PC BOARD
(NASW-2974-1)-PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Diodes	
D711	225137CG or 225137CY or 225137DG or 225137DY	SEL2413E CG, LED SEL2413E CY, LED SEL2413E DG, LED SEL2413E DY, LED
D712, D713, D714	225142DX2	SEL2913K DX2, LED
	Capacitors	
C351, C352	354782299	0.22μF, 50V, Elect.
C353, C354	354784799	0.47μF, 50V, Elect.
	Switches	
S311, S312 S314	25035540 25035541	NPS-162-122-L502 NPS-142-L503
	Socket	
JL701	25050267	NSCT-3P95
	Holder	
	27190493-1	(LED-3)

TONE CONTROL CIRCUIT PC BOARD
(NAAF-2975-1)-PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Capacitors	
C315, C316	379128225	8200pF, 50V, Film (DEW)
C317, C318	379125625	5600pF, 50V, Film (DEW)
C319, C320	379121025	1000pF, 50V, Film (DEW)
C321, C322	379123935	0.039μF, 50V, Film (DEW)
C325, C326	379128235	0.082μF, 50V, Film (DEW)
	Resistors	
R317	5148107	N16RGM C250KMN25, Variable
R321	5148108	N16RGM11C219K25, Variable
R323	5144001	N16RQM11C139K176K25, Variable
R337	5148113A	N16RGM11C176K25, Variable
	Switches	
S309, (S310)	25035539	NPS-142-122-L501
	Sockets	
P101, P102	2000676	NSAS-6P632

INPUT SELECTOR SWITCH PC BOARD
(NASW-2976-1)-PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Switches	
S301~S308	25035538	NPS-742-162-L500

CIRCUIT NO.	PART NO.	DESCRIPTION
	Sockets	
P103	2000551	NSAS-6P507
P301	2000564	NSAS-6P520
P303	2000607	NSAS-18P563
JL103	25050267	NSCT-3P95
P351, P354	25050272	NSCT-8P100
P352, P353, P356	25050267	NSCT-3P95
P355	25050273	NSCT-9P101
	Plugs	
P302	25055137	NPLG-7P121
P501	25055133	NPLG-3P117
	Holder	
	27190494A	(LED-4)

DISPLAY LED PC BOARD (NADIS-2977-1)-PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Diodes	
D302~D308	225137DG or 225137DY or 225137CG or 225137CY	SEL2413E DG, LED or SEL2413E DY, LED or SEL2413E CG, LED or SEL2413E CY, LED
D311~D316, D301	225142CX1 or 225142CX2 or 225142DX1 or 225142DX2	SEL2913K CX1, LED or SEL2913K CX2, LED or SEL2913K DX1, LED or SEL2913K DX2, LED
	Plug	
P303	25055190	NPLG-9P174
	Socket	
JL357	25050272	NSCT-8P100

POWER SWICTH PC BOARD (NASW-2978-1,
NASW-2978-1A, NASW-2978-1C)-PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Switch	
S901	25035398	NPS-111-L362P
	Capacitor	
C991	3500065A	0.01μF AC400V/125V (IS)
	Fuse holder	
F901a F902a	250113 25050065	S-N5051 [D][W][X] YSH403T [G][W][X][A][B]

EQUALIZER CIRCUIT PC BOARD
(NAAF-2979-1)-PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q105	222570	NJM4560DX
	Transistors	
Q101~Q104	2212185 or 2212186	2SK170 GR or 2SK170 BL
	Coils	
L301, L302	231069A	NCH-1119

CIRCUIT NO.	PART NO.	DESCRIPTION
	Capacitors	
C105, C106	372122714	270pF, 50V, Styrene
C107, C108	372121014	100pF 50V, Styrene
C109, C110	379122225	2200pF, 50V, Film (DEW)
C111, C112	379122234	0.022μF, 50V, Film (DEW)
C113, C114	379121834	0.018μF, 50V, Film (DEW)
C115, C116	379124734	0.047μF, 50V, Film (DEW)
C117, C118	391222227	2200μF, 6.3V, Elect.(MUSE)
C119, C120	391280227	2.2μF, 50V, Elect.(MUSE)
C121, C122	379121225	1200pF, 50V, Film (DEW)
C131, C132	354754719	470μF, 25V, Elect.
	Terminals	
P191	25045171	NPJ-4PDBL-65
P395	25045190	NPJ-2PDBL74

	Plugs	
P101~P103, P301	25055133	NPLG-3P117
	Socket	
JL104, JL360	25050267	NSCT-3P95

VOLUME CONTROL PC BOARD (NAAF-2980-1)-PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Resistors	
R361	5144004	N16RQM100KBT100KBT25, Variable
	Socket	
P302	2000622A	NSAS-14P578

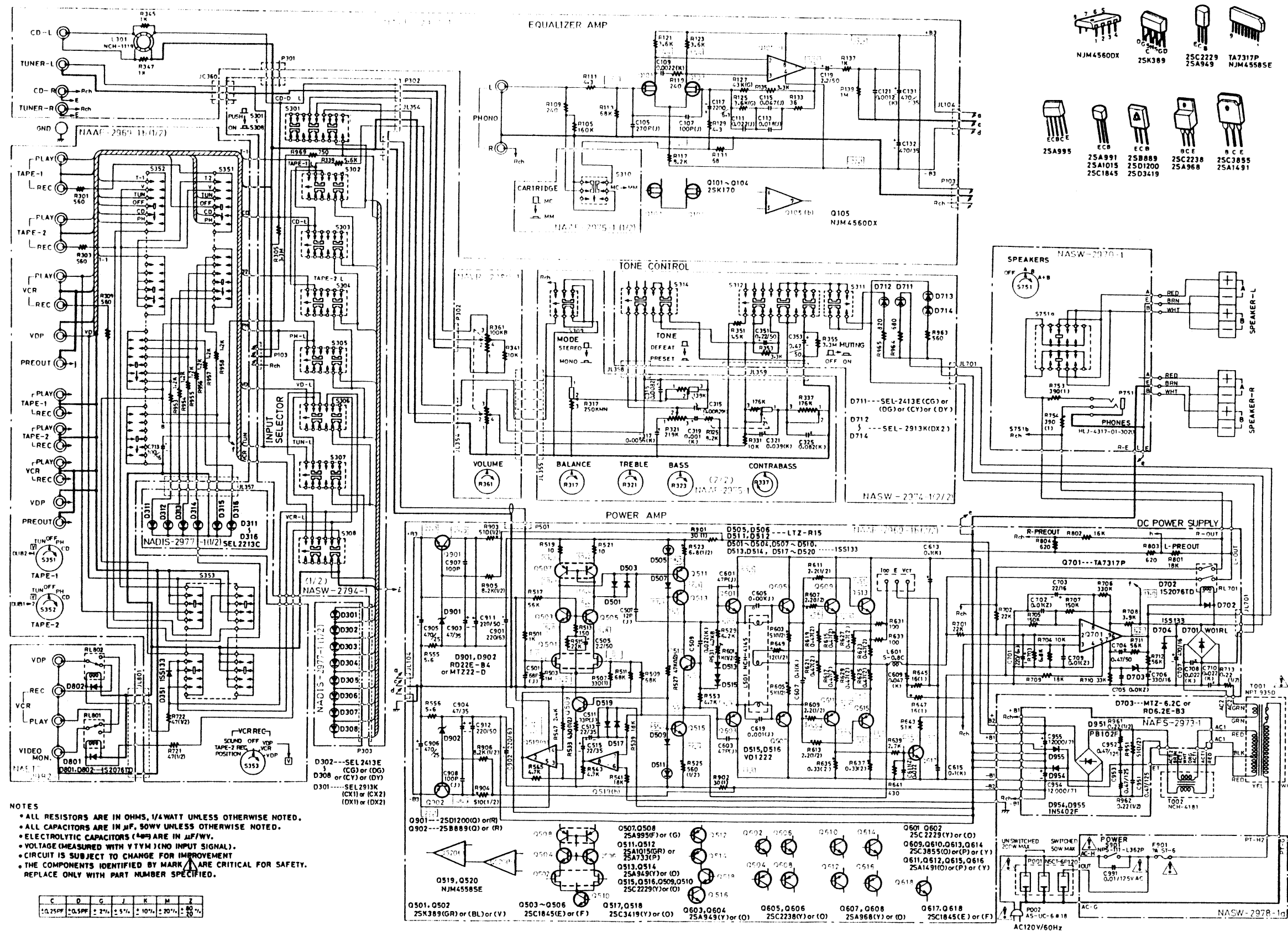
VIDEO TERMINAL PC BOARD (NAETC-2982-1)-PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Diodes	
D801, D802	223145	1S2076TD
	Relays	
RL801, RL802	25065298	NRL-1PIA-DC12-40
	Socket	
J1801	25050268	NSCT-4P96
	Terminal	
	25045207	NPJ-4PDBL87

[D]: Only 220V model
[G]: Only 240V model
[W]: Only 120V/220V model
[X]: Only Military market model
[A]: Only Australian model
[B]: Only British model

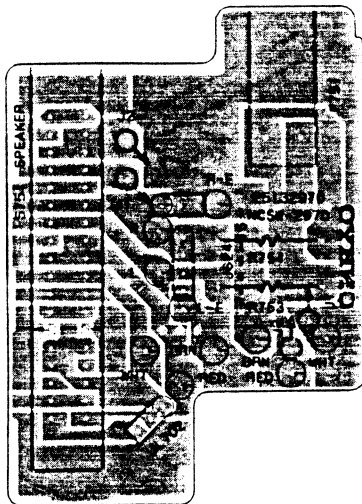
SCHEMATIC DIAGRAM

(120V Model)

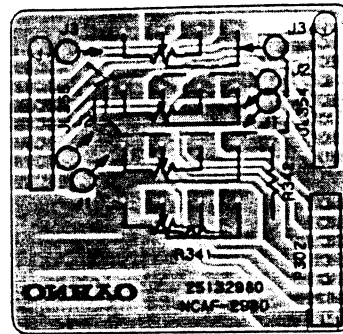


PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE

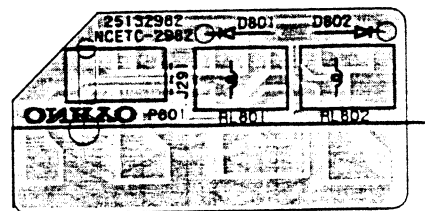
NASW-2970



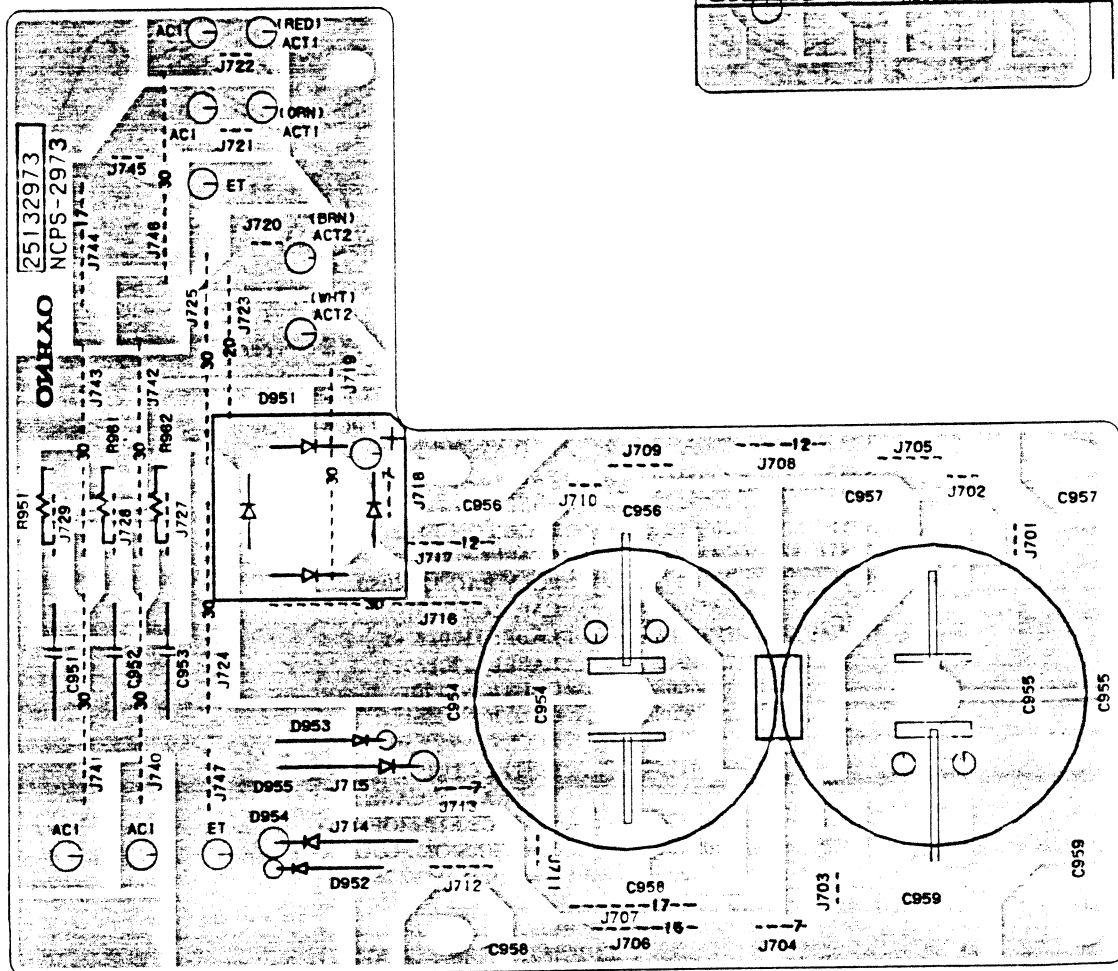
NAAF-2980



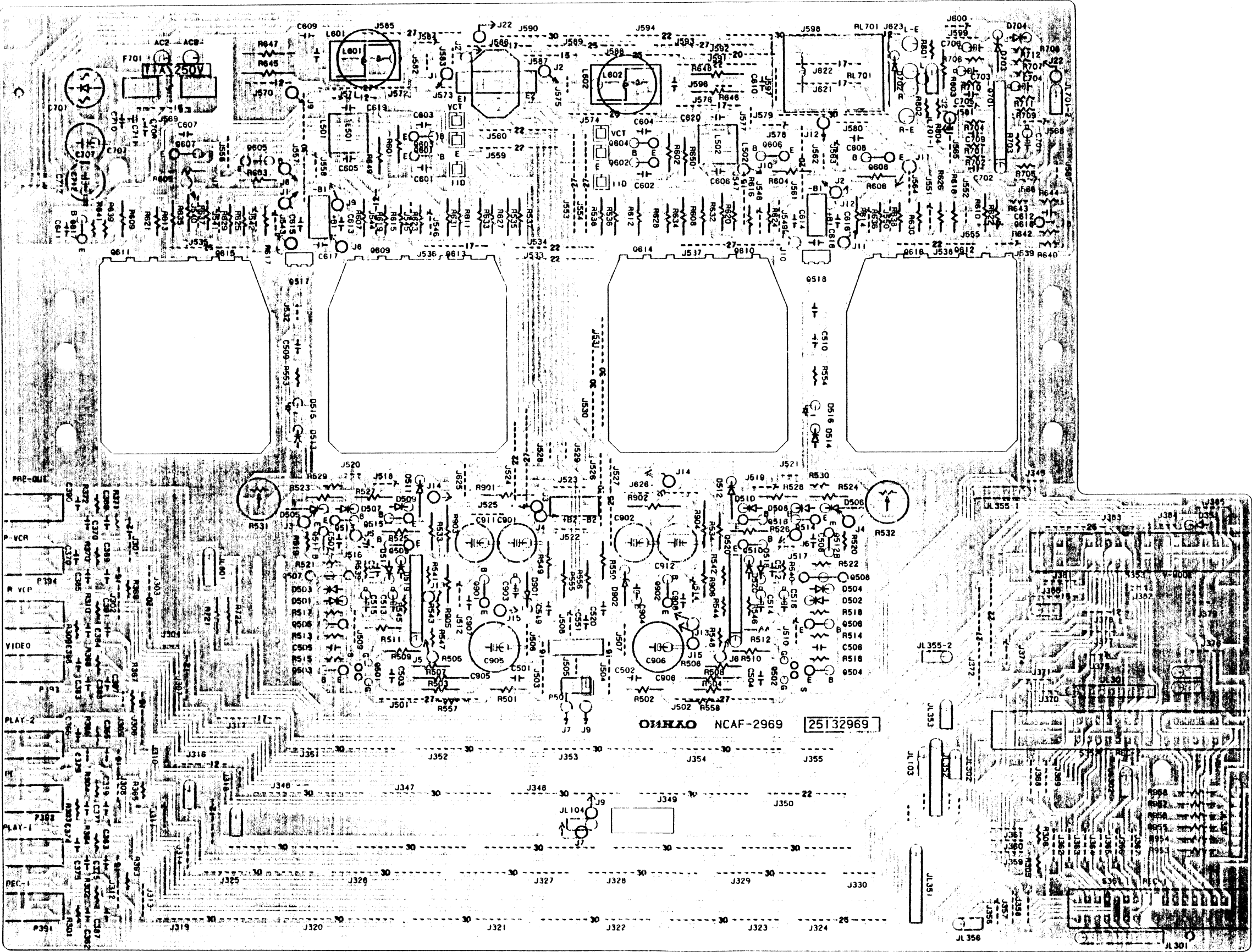
NAETC-2982



NAPS-2973

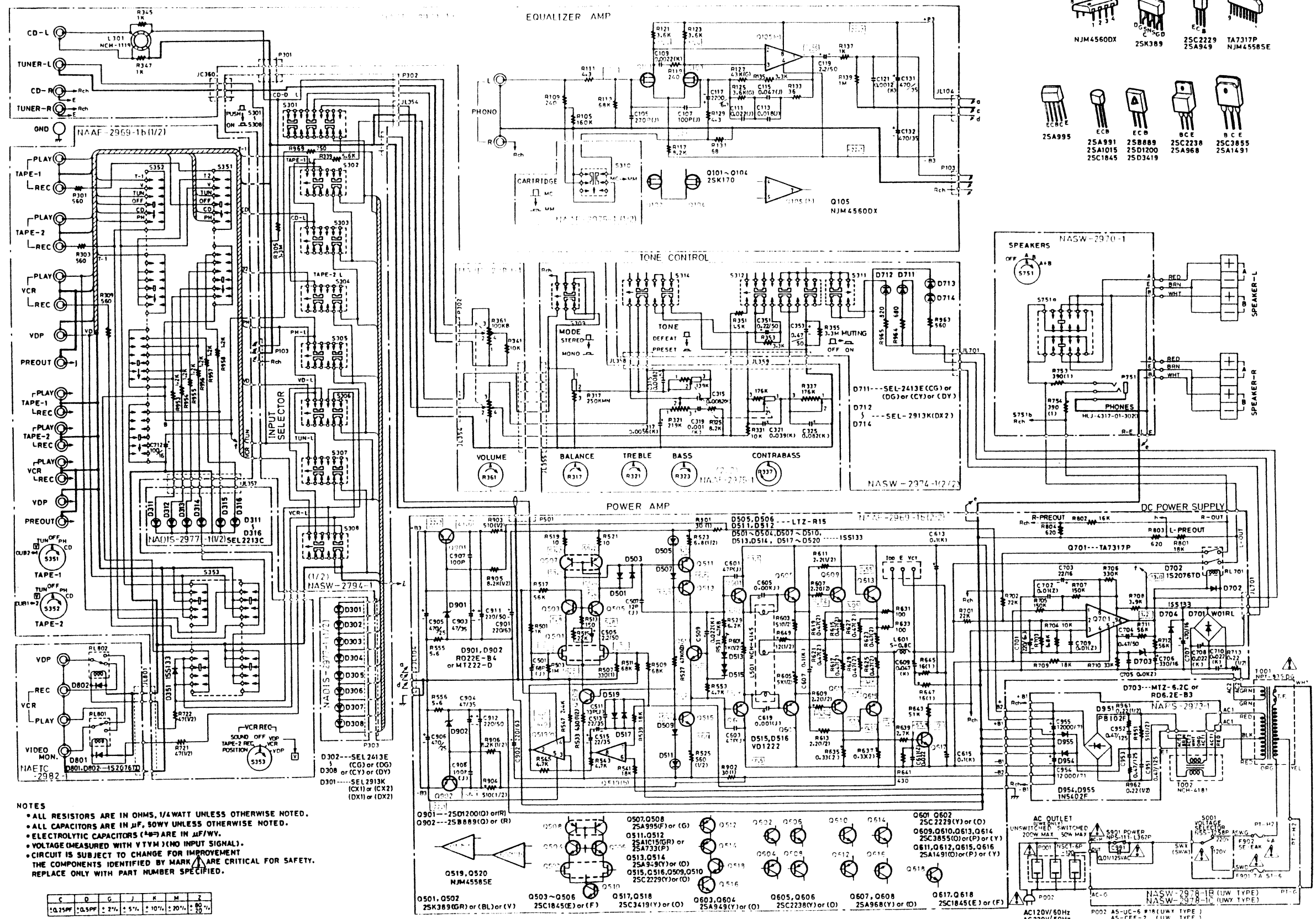


NAAF-2969



SCHEMATIC DIAGRAM

(120V, 220V Model)



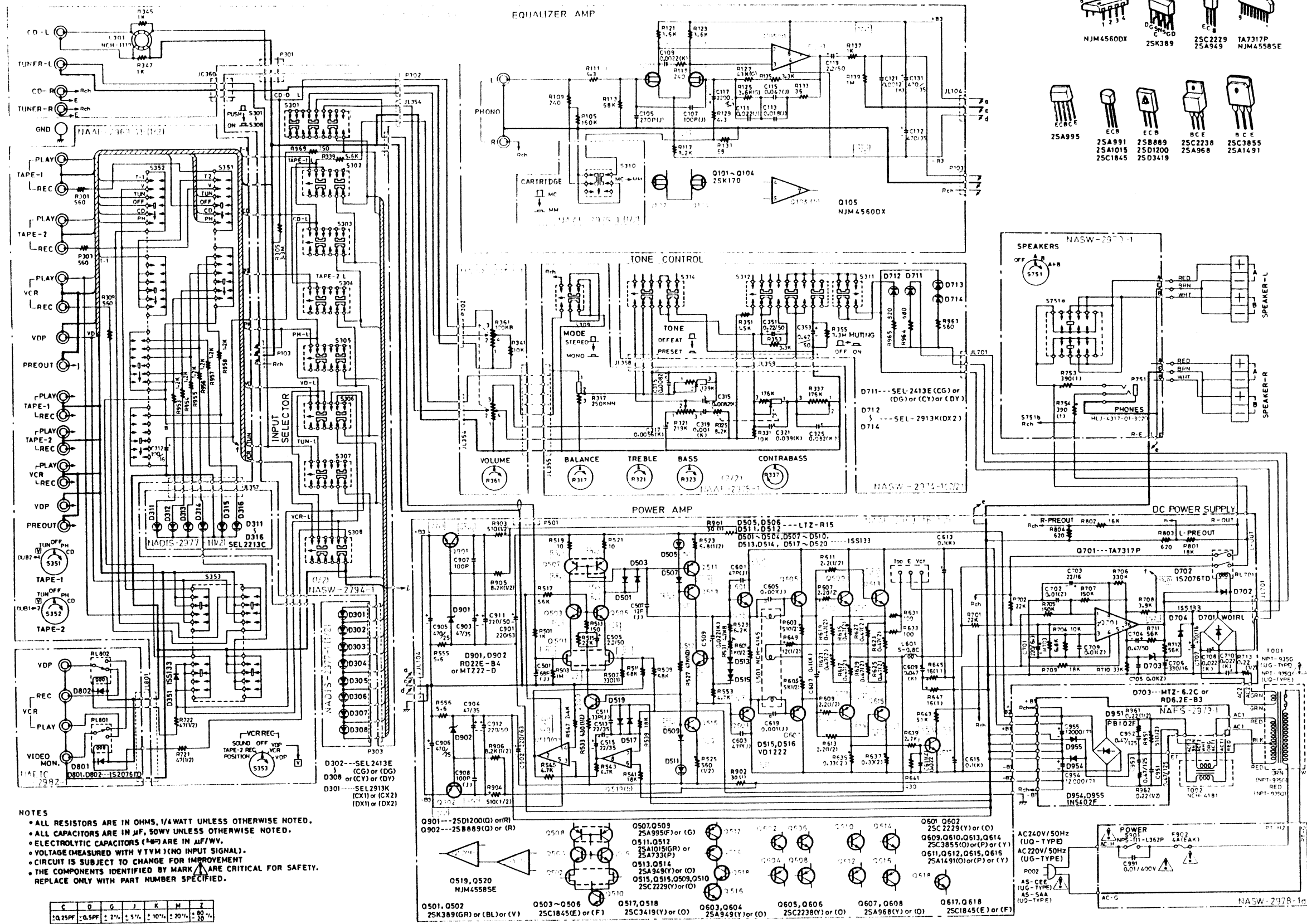
- NOTES
- ALL RESISTORS ARE IN OHMS, 1/4WATT UNLESS OTHERWISE NOTED.
 - ALL CAPACITORS ARE IN µF, 50V UNLESS OTHERWISE NOTED.
 - ELECTROLYTIC CAPACITORS (E) ARE IN µF/WV.
 - VOLTAGE (MEASURED WITH VTM) (NO INPUT SIGNAL).
 - CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.
 - THE COMPONENTS IDENTIFIED BY MARK ARE CRITICAL FOR SAFETY. REPLACE ONLY WITH PART NUMBER SPECIFIED.

C	D	G	J	K	M	N
±0.25%	±0.5%	±1%	±5%	±10%	±20%	±50%

ONKYO CORPORATION

SCHEMATIC DIAGRAM

(220V/240V Model)



ONKYO CORPORATION

